pores at the bases of the arms of *Caryocrinus*, and in part, as I shall show in another part of these notes, of the ambulacral orifices of the true Crinoids.

With regard to the structure of the calyx of *Pentremites*, it is generally supposed that there are only three series of plates —the basal, radial, and interradial. Mr. Lyon has advanced the opinion that there are three small plates below those now called the basals (Geol. Ky. vol. iii. p. 468, pl. 2. fig. 1 *c*). I have examined a number of specimens with reference to this point, and I think he is right. There are three small pentagonal basals, the two upper sides of each of which are excavated to receive the subradials, *i.e.* those at present designated "the basals." They are in general anchylosed to the subradials; but in one of Mr. Lyon's specimens that I have seen they are distinctly separate.

[To be continued.]

XXVII.—*Note on an undescribed Fossil Fish from the Newsham Coal-shale near Newcastle-upon-Tyne.* By Albany Hancock, F.L.S., *and* Thomas Atthey.

For several years past we have been much puzzled with a large ichthyic tooth that is not by any means uncommon at Newsham. We could not make out to what fish to assign it. Indeed there is but one, of sufficient size, found in the locality, of which the teeth are not known, that was at all likely; and the remains of this were supposed to belong to *Rhizodus*; and as the teeth in question are perfectly devoid of cutting-edges, they could not belong to it. We had doubts, however, as to these remains really being those of that obscure fossil, and thought that probably they would be found some day or other associated with our unknown tooth—that it belonged, in fact, to these supposed *Rhizodus*-bones. And such is apparently the case.

A jaw has just been obtained at Newsham with one of these large enigmatical teeth attached, and the surface-ornament of the bone is of the same character as that of the remains alluded to. This jaw, which is a left mandible, is quite perfect in front; but the proximal extremity is broken away. The part that remains is upwards of seven inches long, and an inch and five-eighths wide; the margins are nearly parallel; the alveolar border is pretty straight, but rises up a little in front, which is rounded. About an inch behind the anterior extremity, a large stout laniary tooth is placed on this elevated part; it is slightly recurved, but the apex is gone. What remains mea-

sures an inch in length; the base is broad, being quite five-eighths of an inch wide; and the upper, broken extremity is three-eighths of an inch across. When perfect, this tooth could not be less than an inch and five-eighths in length, as is proved by comparing it with a perfect tooth of the same size at the base. The base is deeply folded, the folds being rounded and covered with minute, sharp, raised striæ, which pass upwards and die gradually out as they approach the broken extremity.

Along the alveolar border there are nine small teeth, three-eighths of an inch long; they have much the character of the large laniary tooth, exhibiting the same minute characteristic striation, but do not seem to be folded at the base. The first of these is about a quarter of an inch behind the large tooth; the next two are about the same distance apart from each other and from the first tooth; the fourth, fifth, and sixth are divided from these and from each other by a space of five-eighths of an inch; the seventh is a little more than one-eighth of an inch from the sixth, and a quarter of an inch from the ninth, which is an inch and a quarter from the broken extremity of the mandible.

The whole surface of the dentary bone is covered with small rough tubercles, which have a tendency to run in lines, producing vermicular grooves. This peculiar character of bone-surface at once associates our mandibular fragment with the remains already referred to, and supposed to be those of *Rhizodus*, and for a description of which we must content ourselves, on the present occasion, with referring to our paper "On Reptiles and Fishes from the Shales of the Northumberland Coal-field" (Ann. Nat. Hist. ser. 4. vol. i. p. 346). But we may remark that among these remains are many well-marked fragments and several perfect crescentic gill-plates or opercula, the largest being six inches in length; but one recently acquired is seven inches long; and a broken specimen in our possession could not have measured much under eight inches when perfect. There are also described along with these remains two or three jugular plates six inches long; and these are associated with a number of the body-scales, three inches in diameter, usually supposed to be those of *Rhizodus*.

Here, then, we have the crescentic opercula usually attributed to *Rhizodus*, and jugular plates, with many other bones, all having the surface-ornament similar to that assigned to that fossil, and associated with the body-scales described as belonging to it—all occurring in a locality where the unmistakable tooth of the large *Rhizodus* has never yet been found. And in this locality another large tooth occurs, with peculiar

characters, and has now been found attached to a jaw the surface-ornament of which perfectly accords with that of the above-mentioned remains. However it may be with *Rhizodus*, it would therefore seem impossible not to adopt the conclusion that all these specimens belong to one and the same fish; and the tooth proves that they can have nothing to do with *Rhizodus*. For this fish, then, so characterized, and which seems to us to be generically as well as specifically new, we propose the name *Archichthys sulcidens*.

We must add, before concluding this note, that the teeth of our new fish sometimes measure two and a half inches in length and are upwards of an inch wide at the base, and that upwards of a score of specimens of it have occurred at Newsham. It is therefore pretty certain that they never attain the dimensions of those of *Rhizodus*, from which they can always be distinguished by their rotundity, the total absence of cutting-edges, and the fine striation of the surface, though they are folded at the base in a manner similar to those of that great enigma.

We may also add that thirteen opercular plates have been found, some being quite perfect and in excellent condition. The scales, too, are not by any means rare in the same locality. The remains, then, of this fish being so abundant, the non-occurrence of the large *Rhizodus*-tooth is very significant.

XXVIII.—*On a new Species of* Sagitta *from the South Pacific* (S. tricuspidata). By Wm. S. Kent, F.Z.S., F.R.M.S., of the Geological Department, British Museum.

Some months since, Mr. T. J. Moore, the able Conservator of the Free Public Museum, Liverpool, received from the South Pacific, in company with *Leptocephali* and an infinite number of other oceanic forms (the produce of surface-dredging on the high seas), certain organisms of such a fish-like outward appearance, that they were consigned to the hands of a celebrated ichthyologist for identification. The peculiar armature of their cephalic region plainly indicated, however, that, if fish, they were very aberrant representatives of the class.

The privilege of examining them having been afforded me, the idea at once suggested itself that they belonged to that interesting group, most closely approximating to the Annelida, designated by Professor Huxley the Chætognatha, and of which *Sagitta* constitutes the single genus.

Subsequent investigation substantiated the correctness of the inference primarily arrived at, and at the same time de-